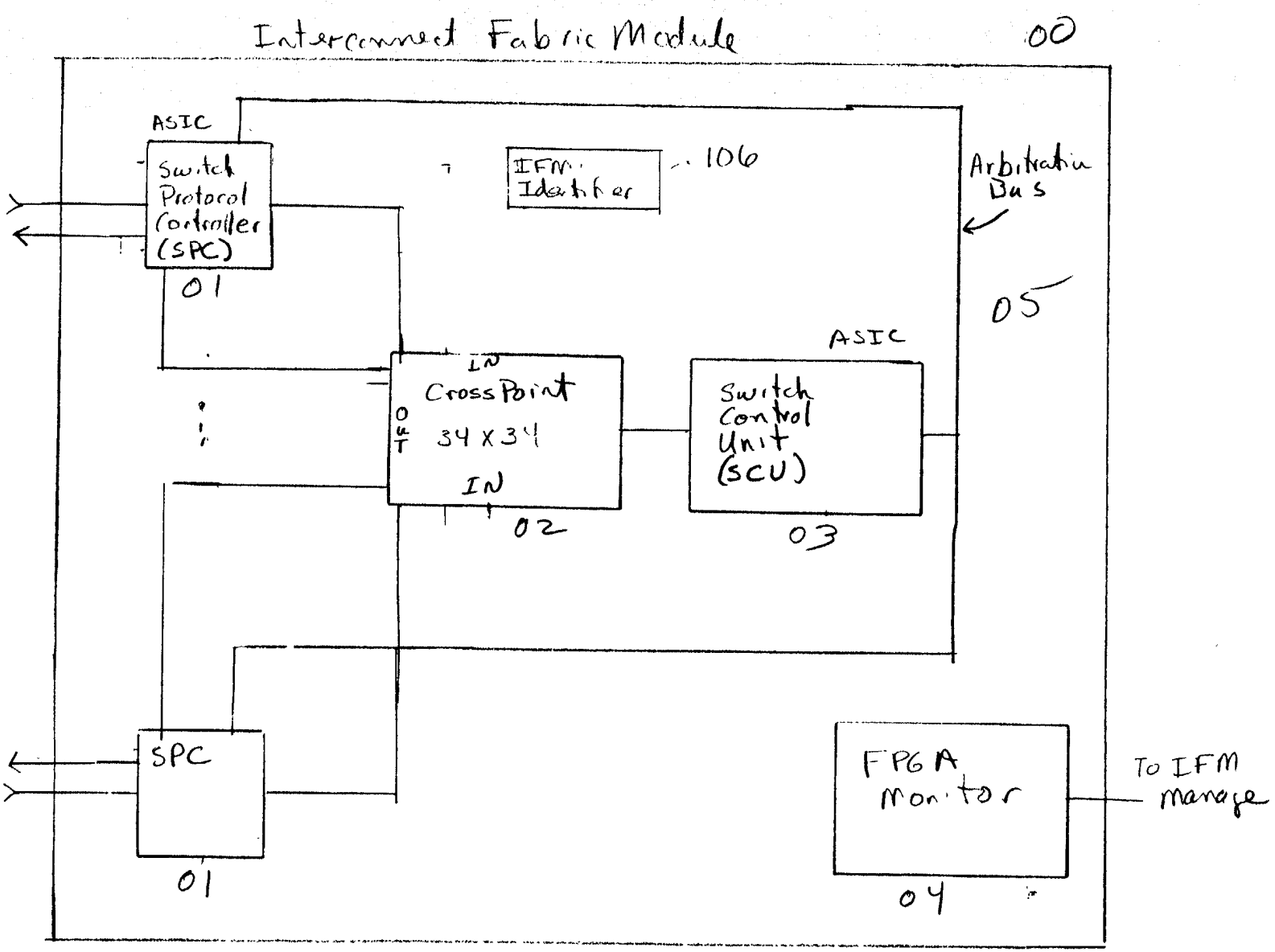

Interconnect Fabric Module
00
ASIC
Switch Protocol Controller (SPC)
01
IFM Identifier
106
Arbitration Bus
05
ASIC
IN
CrossPoint
OUT 34 x 34
IN
02
Switch Control Unit (SCU)
03
SPC
01
FPGA Monitor
04
To IFM manage

Fig 1

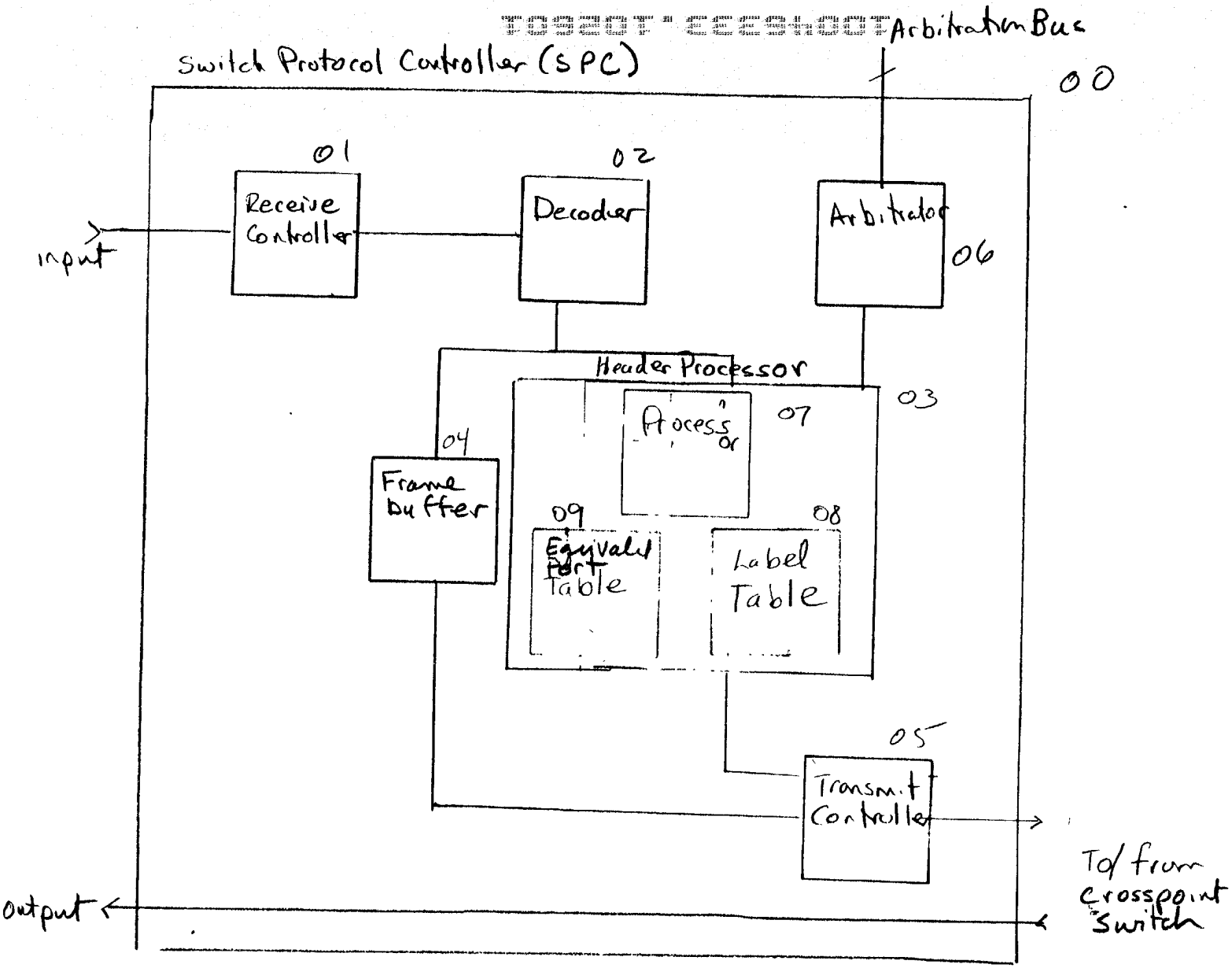

Arbitration Bus
Switch Protocol Controller (SPC)
00
01
02
Receive Controller
Decoder
Arbitrator
06
input
Header Processor
03
Processor
07
04
Frame Buffer
09
08
Equivalent Port Table
Label Table
05
Transmit Controller
To/from crosspoint switch
output

Fig 2

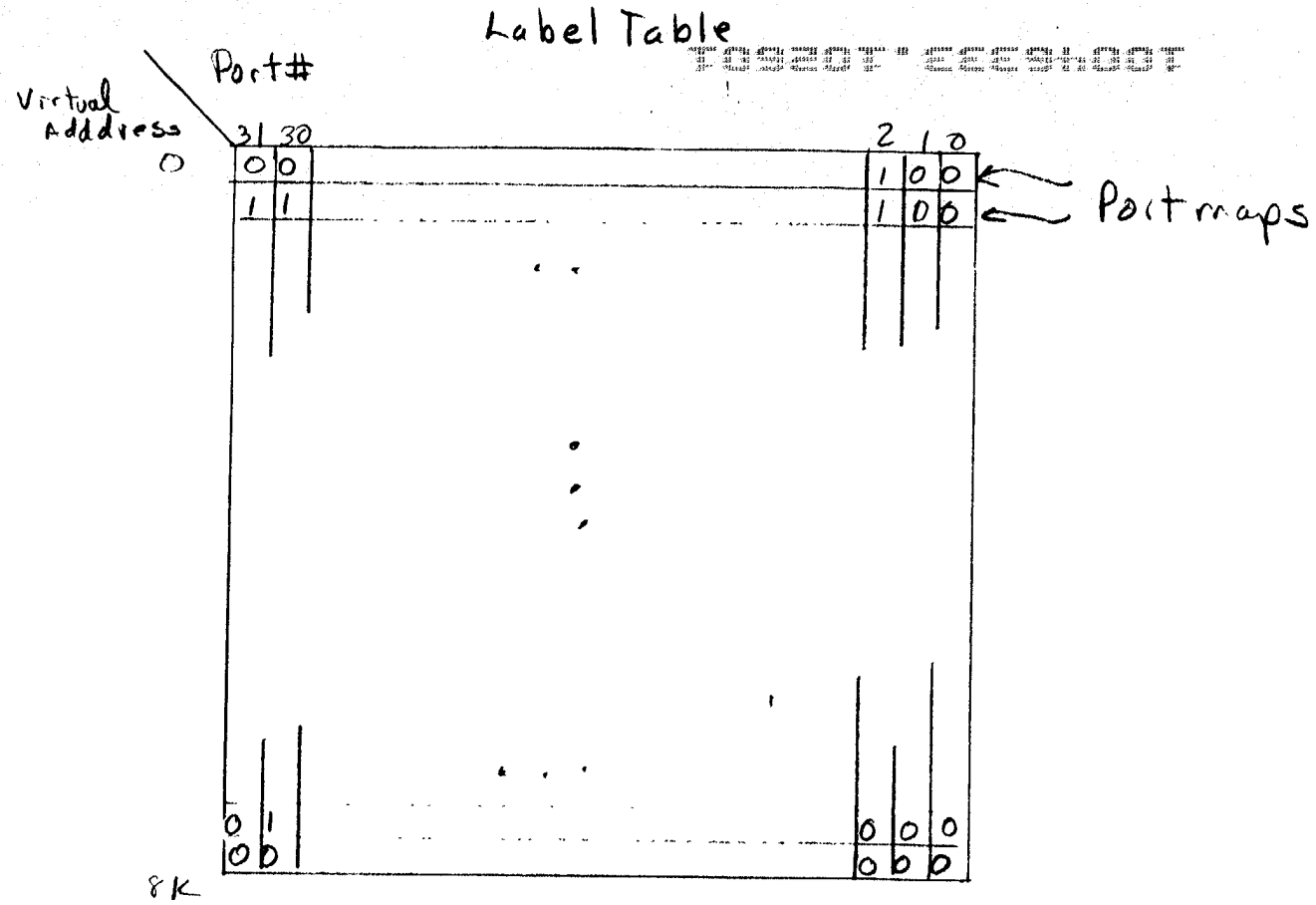


Fig 3

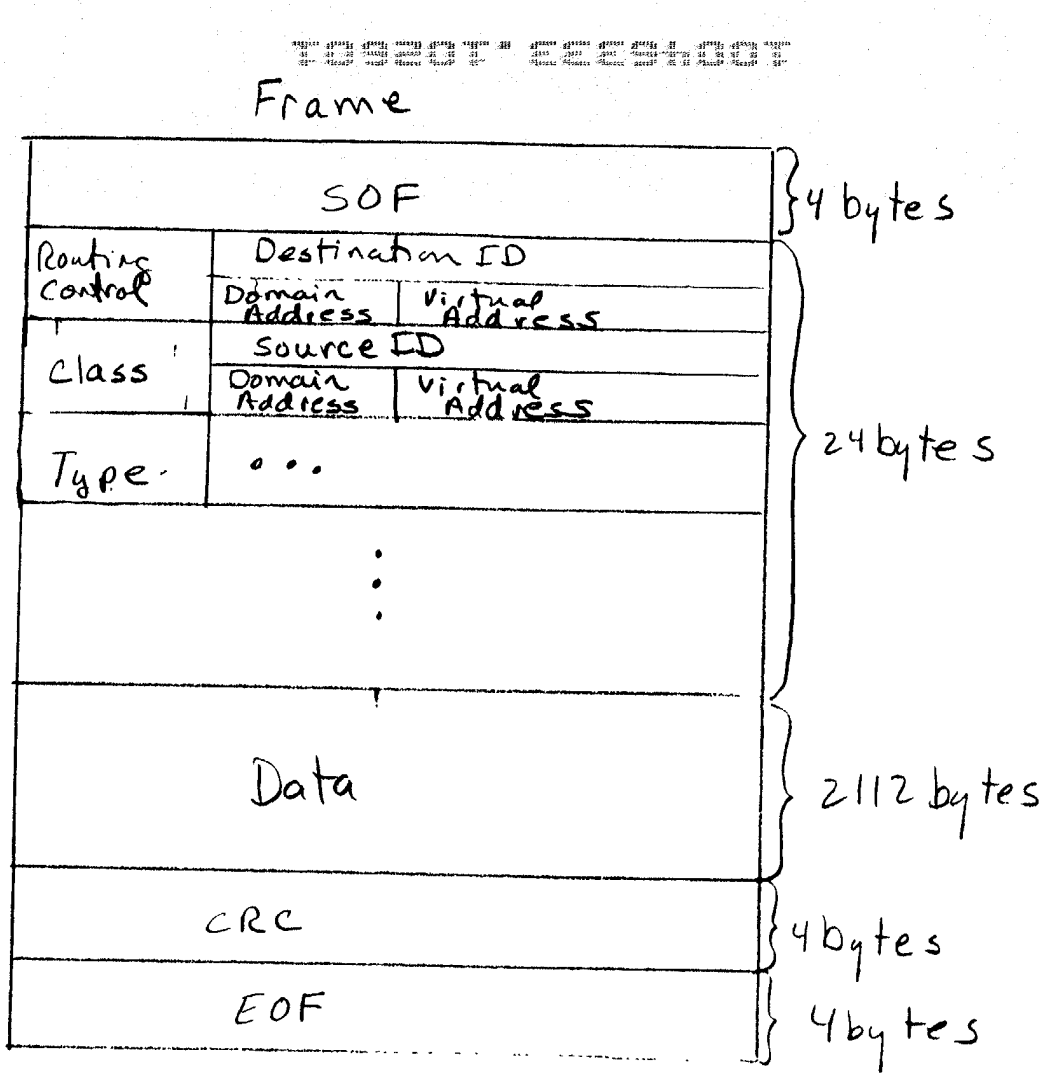

Frame
SOF
4 bytes
Routing Control
Destination ID
Domain Address
Virtual Address
Class
Source ID
Domain Address
Virtual Address
Type
...
24 bytes
Data
2112 bytes
CRC
4 bytes
EOF
4 bytes

Fig 4

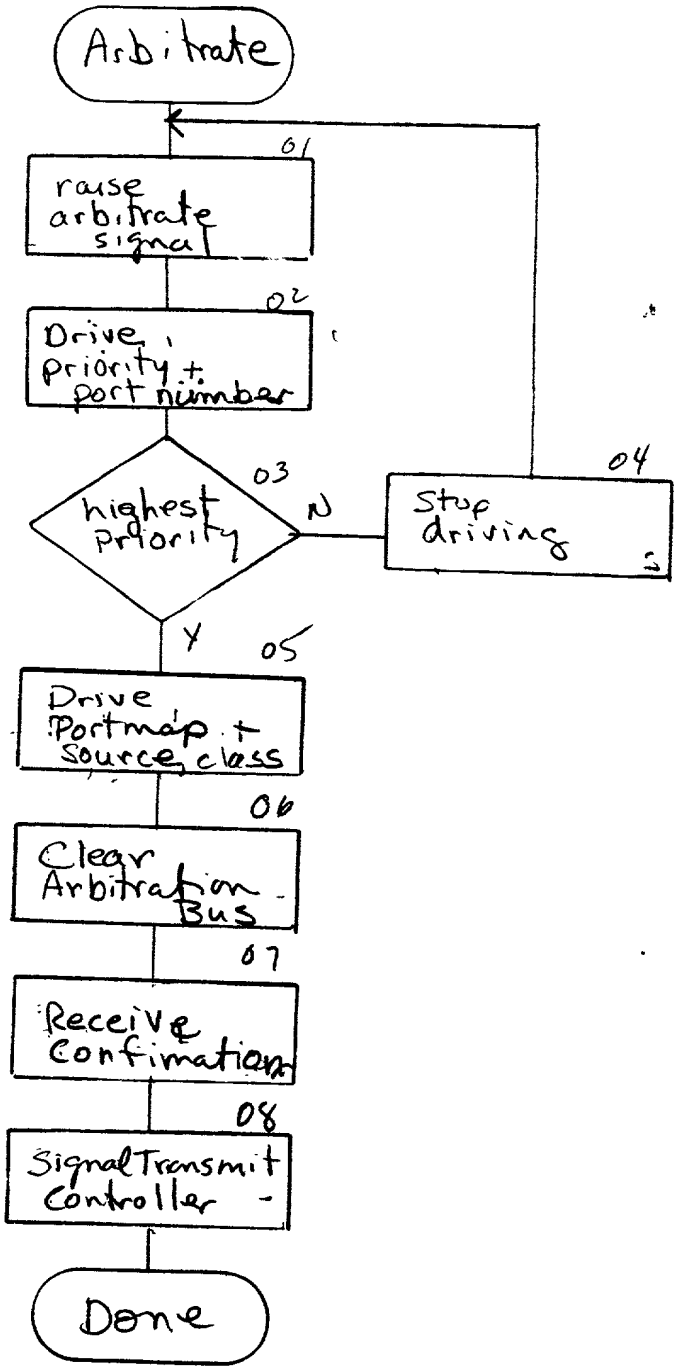

Arbitrate
01
raise arbitrate signal
02
Drive priority + port number
03
highest priority
N
04
Stop driving
Y
05
Drive Portmap + Source class
06
Clear Arbitration Bus
07
Receive Confimation
08
Signal Transmit Controller
Done

Fig 5

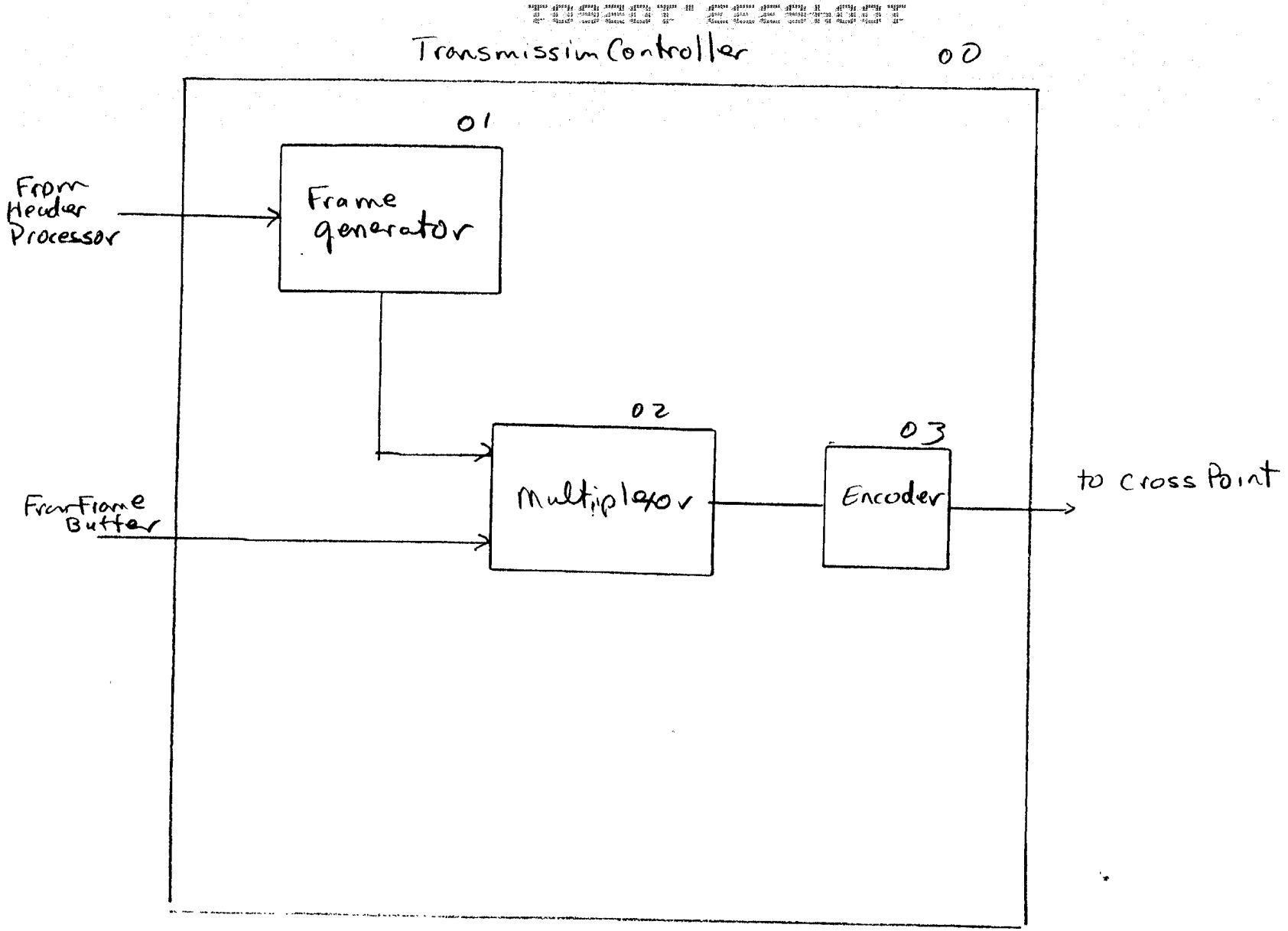

Transmission Controller
00
01
From Header Processor
Frame generator
02
03
From Frame Buffer
Multiplexor
Encoder
to cross Point

Fig 6

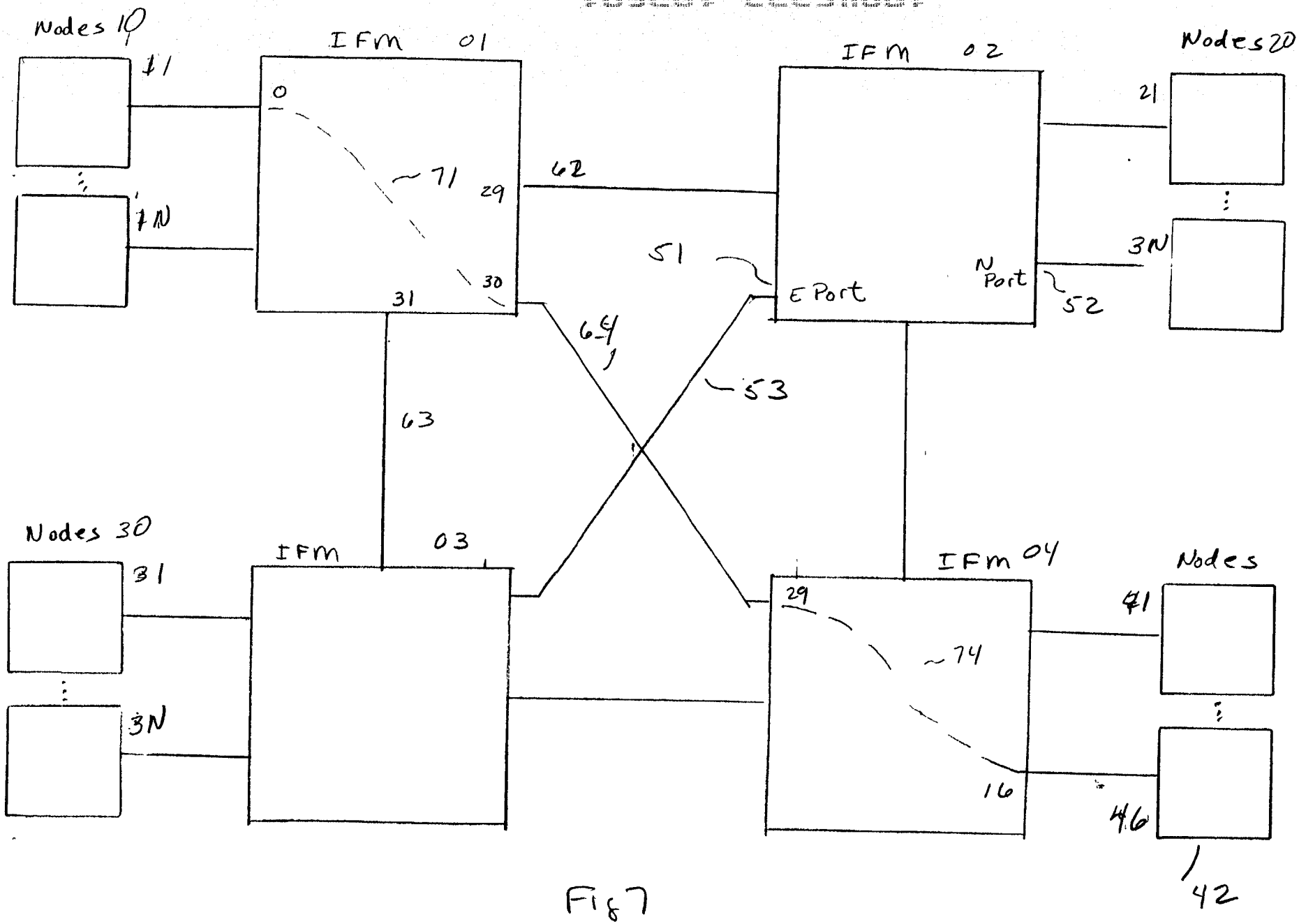

Nodes 10
11
1N
IFM 01
0
71
29
30
31
62
IFM 02
Nodes 20
21
3N
51
E Port
N Port
52
64
53
63
Nodes 30
31
3N
IFM 03
IFM 04
29
74
16
Nodes
41
46
42

Fig 7

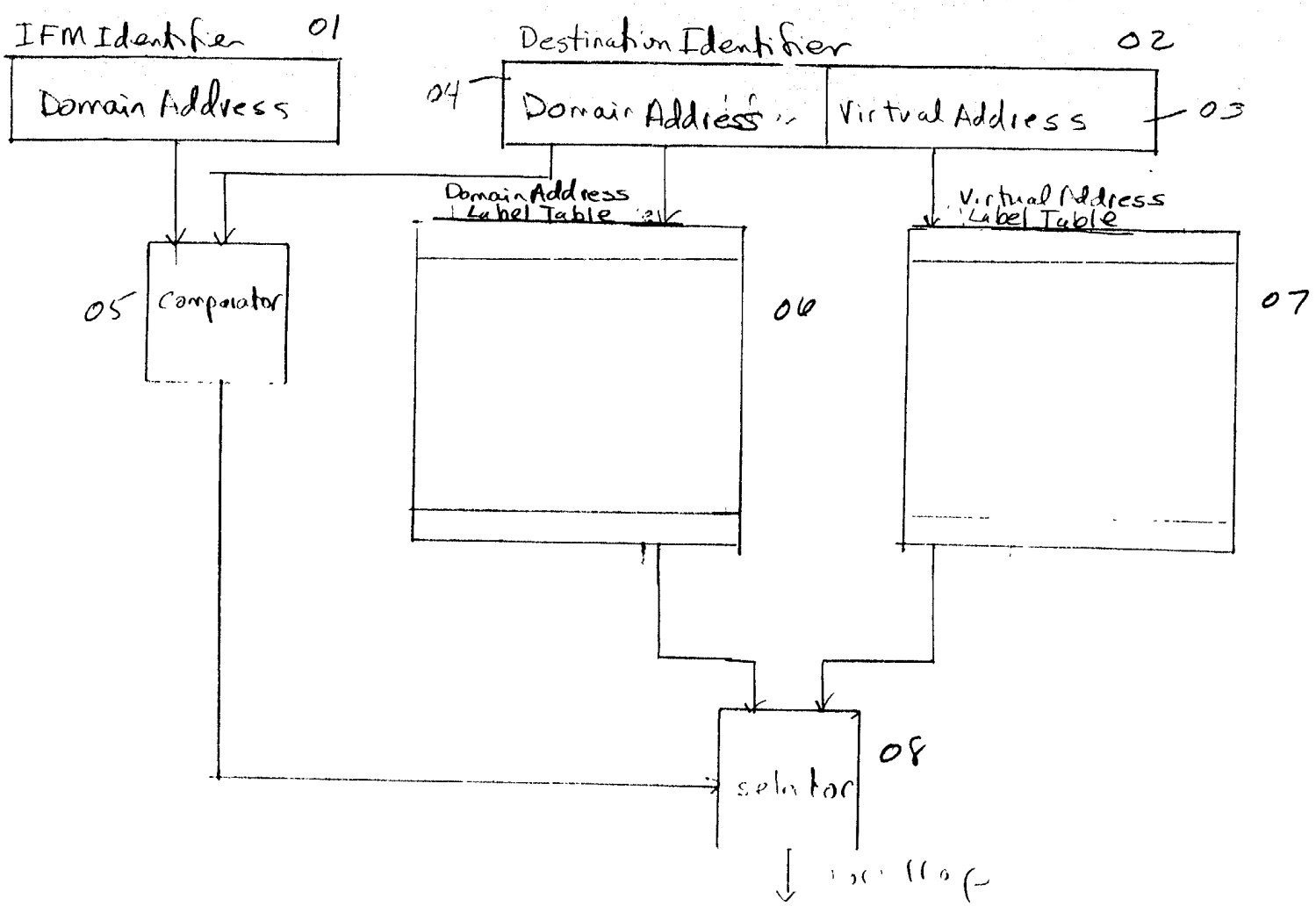

IFM Identifier
01
Domain Address
Destination Identifier
02
04
Domain Address
Virtual Address
03
Domain Address Label Table
Virtual Address Label Table
05
Comparator
06
07
08

Fig. 8

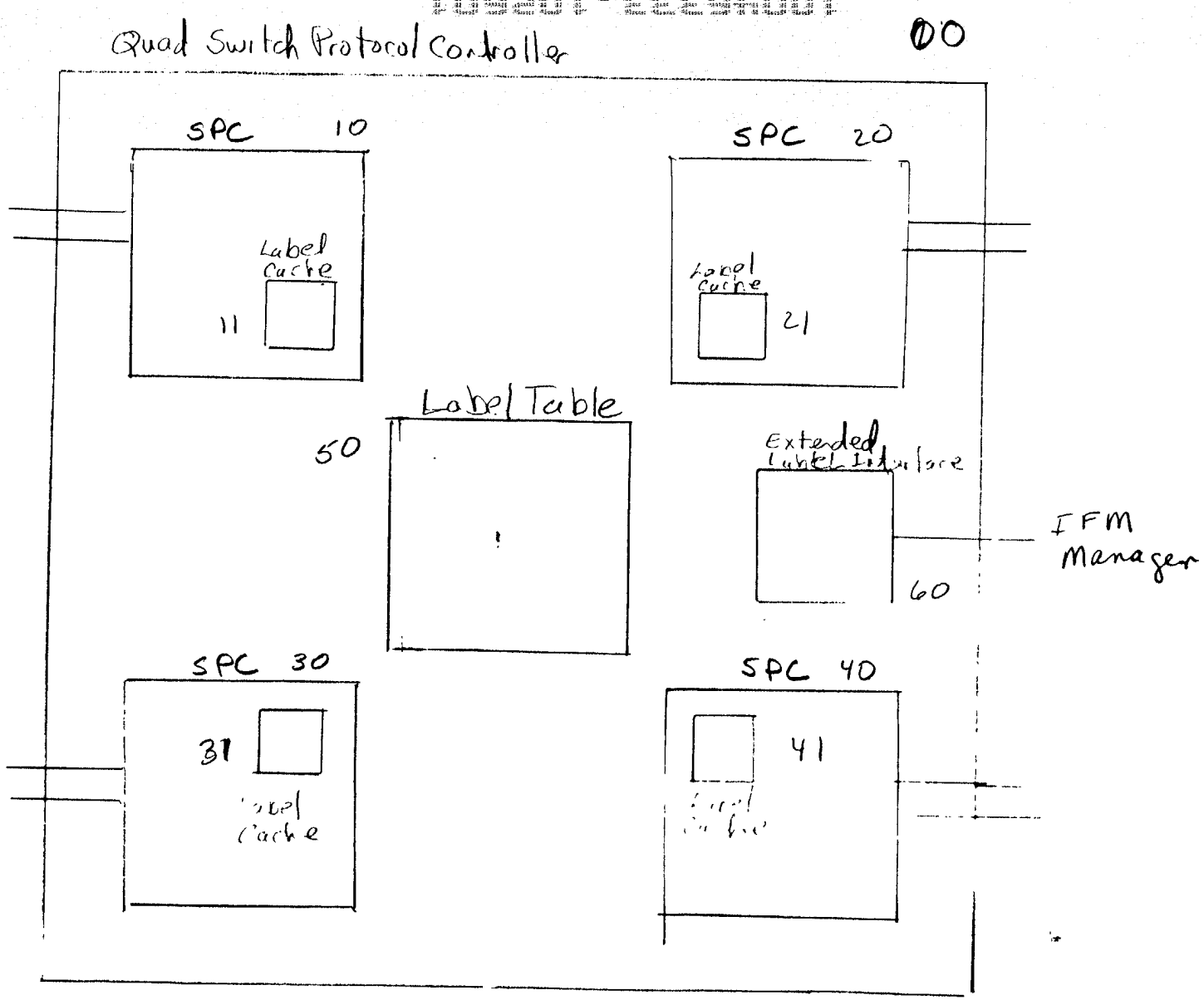

Quad Switch Protocol Controller
00
SPC 10
Label Cache
11
SPC 20
Label Cache
21
Label Table
50
Extended Label Interface
60
IFM Manager
SPC 30
31
Label Cache
SPC 40
41

Fig 9

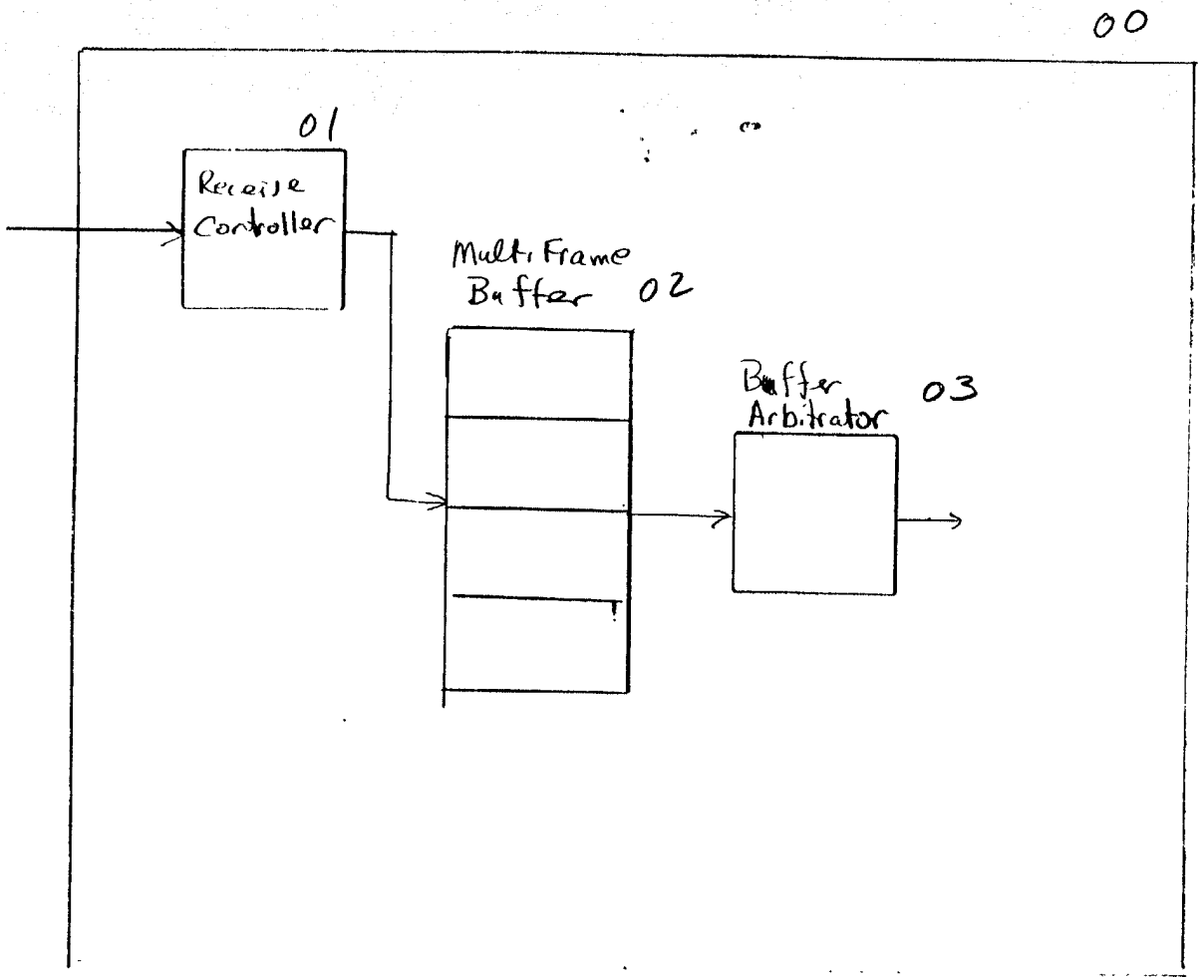

00
01
Receive Controller
Multi Frame Buffer 02
Buffer Arbitrator 03

Fig 10

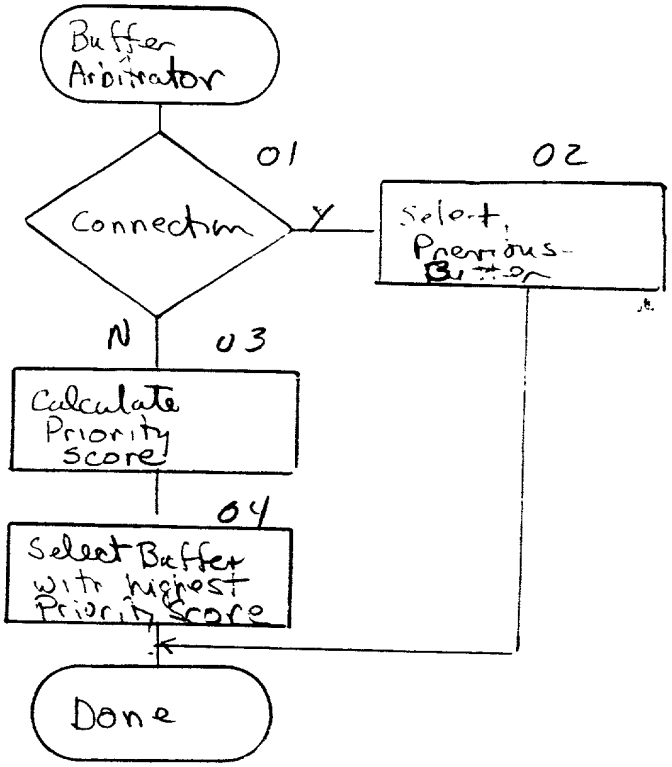

Buffer Arbitrator
01
Connection
Y
02
Select Previous Buffer
N
03
Calculate Priority score
04
Select Buffer with highest Priority Score
Done

Fig 11

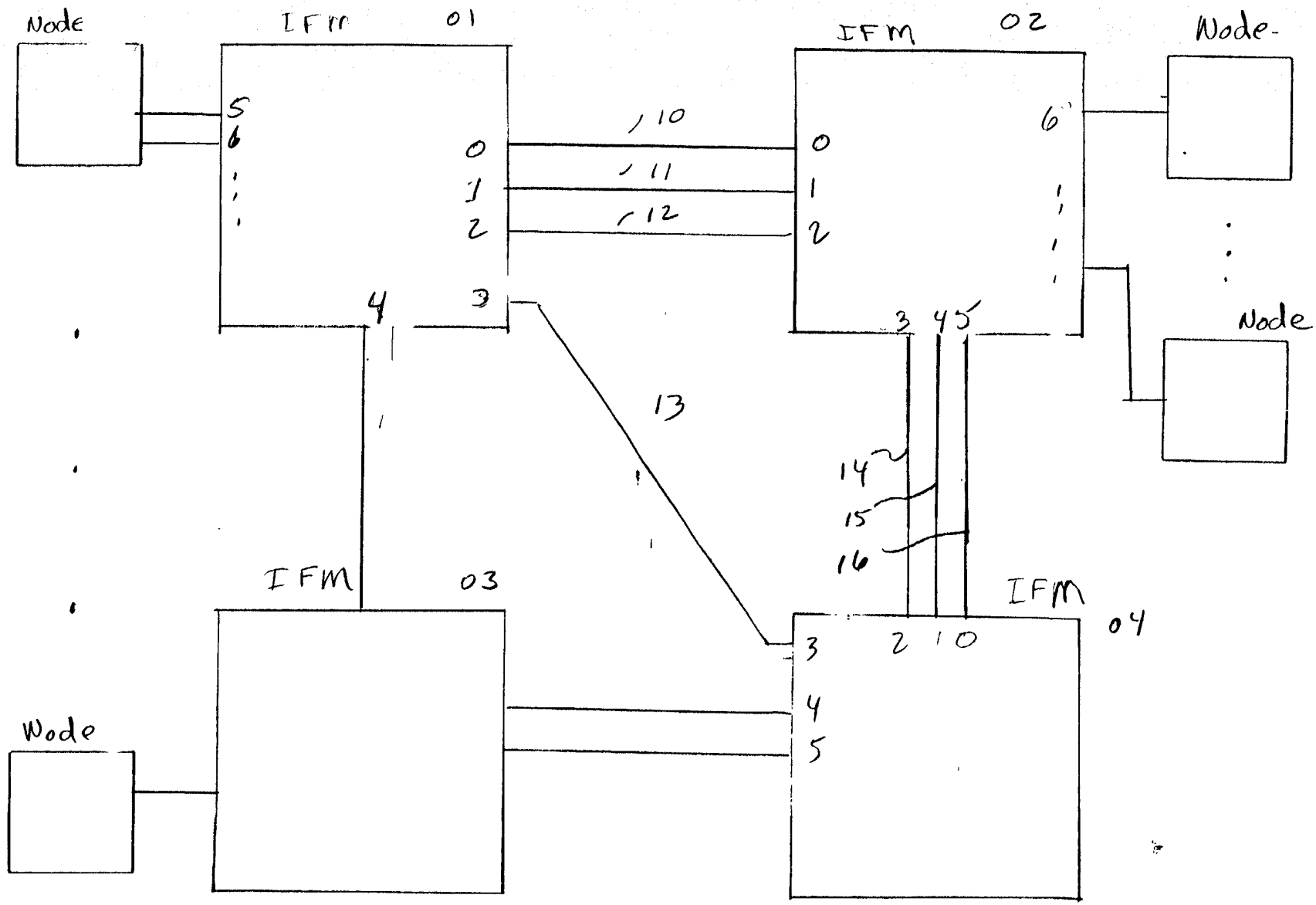

Node
IFM 01
IFM 02
Node
Node
Node
IFM 03
IFM 04
Node
5
6
0
1
2
3
4
10
11
12
13
14
15
16
0
1
2
3
4
5
6
3
2
1
0
4
5

Fig 12

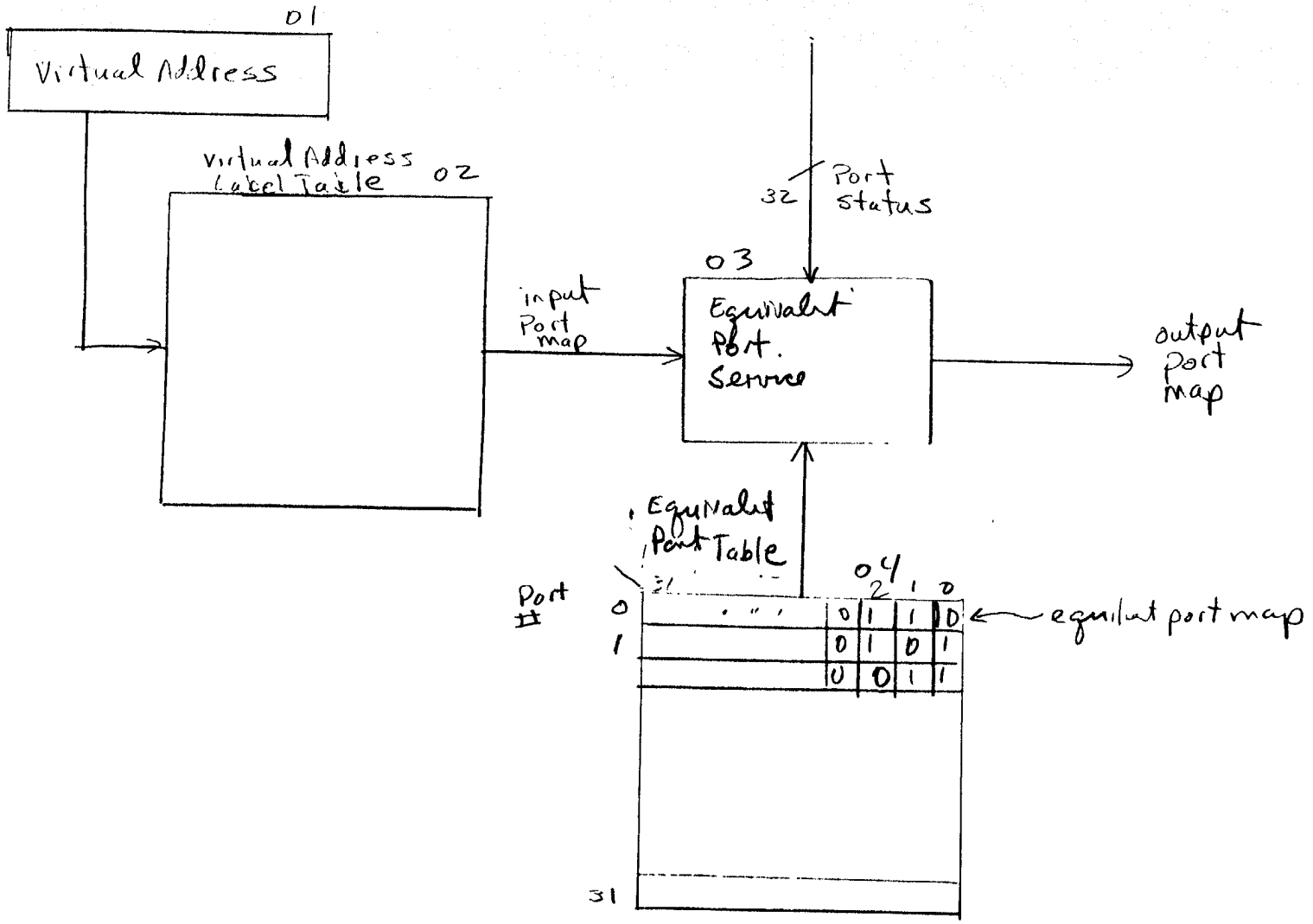

01
Virtual Address
Virtual Address Label Table
02
32
Port status
03
input Port map
Equivalut Port. Service
output Port map
Equivalut Port Table
04
Port #
31
2
1
0
0
1
31
0 1 1 0
0 1 0 1
0 0 1 1
equilut port map

Fig 13

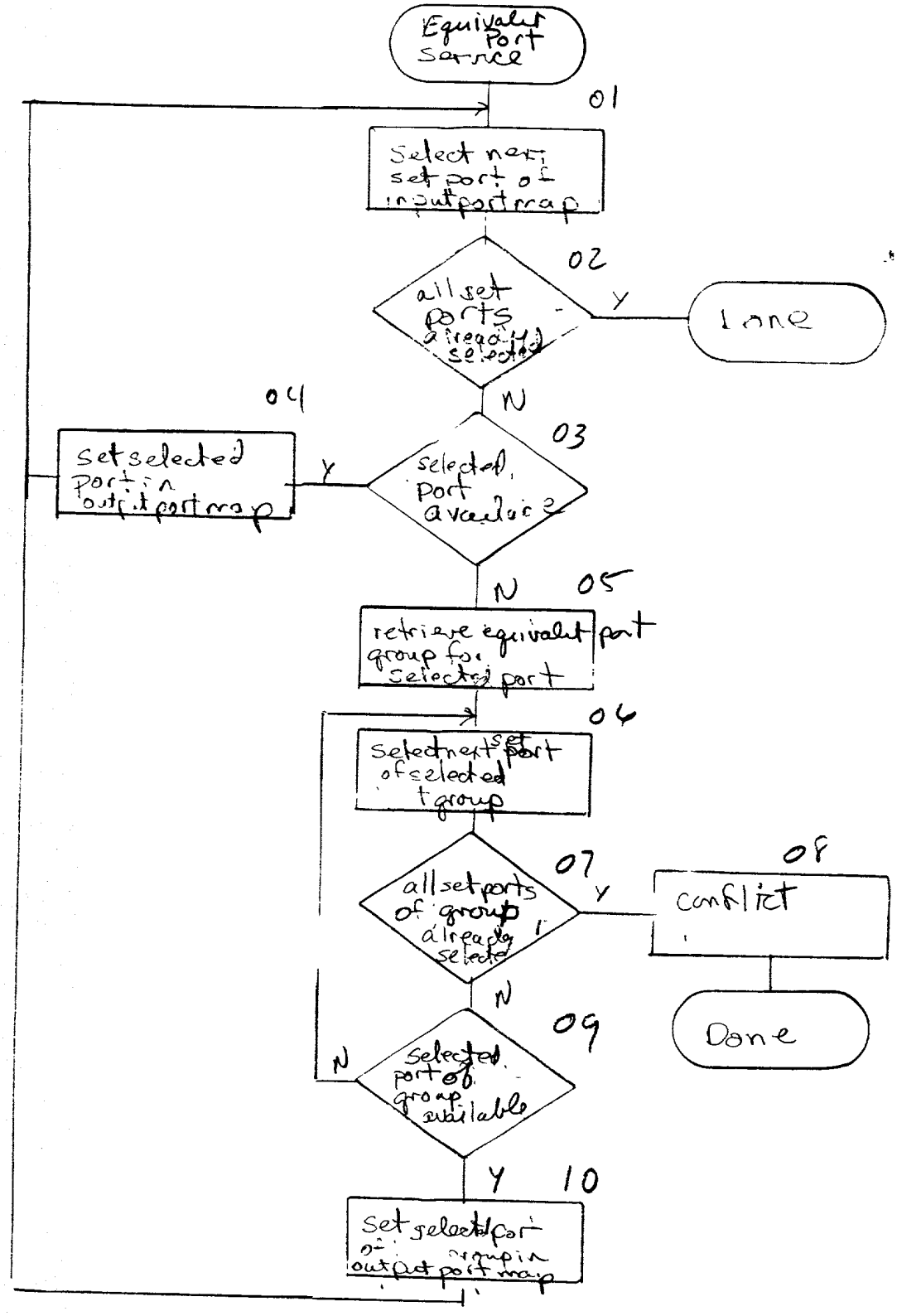

Equivalent Port Service
01
Select next set port of input port map
02
all set ports already selected
Y
Done
N
03
selected port available
Y
04
set selected Port in output port map
N
05
retrieve equivalent port group for selected port
06
Select next set port of selected group
07
all set ports of group already selected
Y
08
conflict
Done
N
09
Selected port of group available
N
Y
10
Set selected port of input in output port map

Fig 14

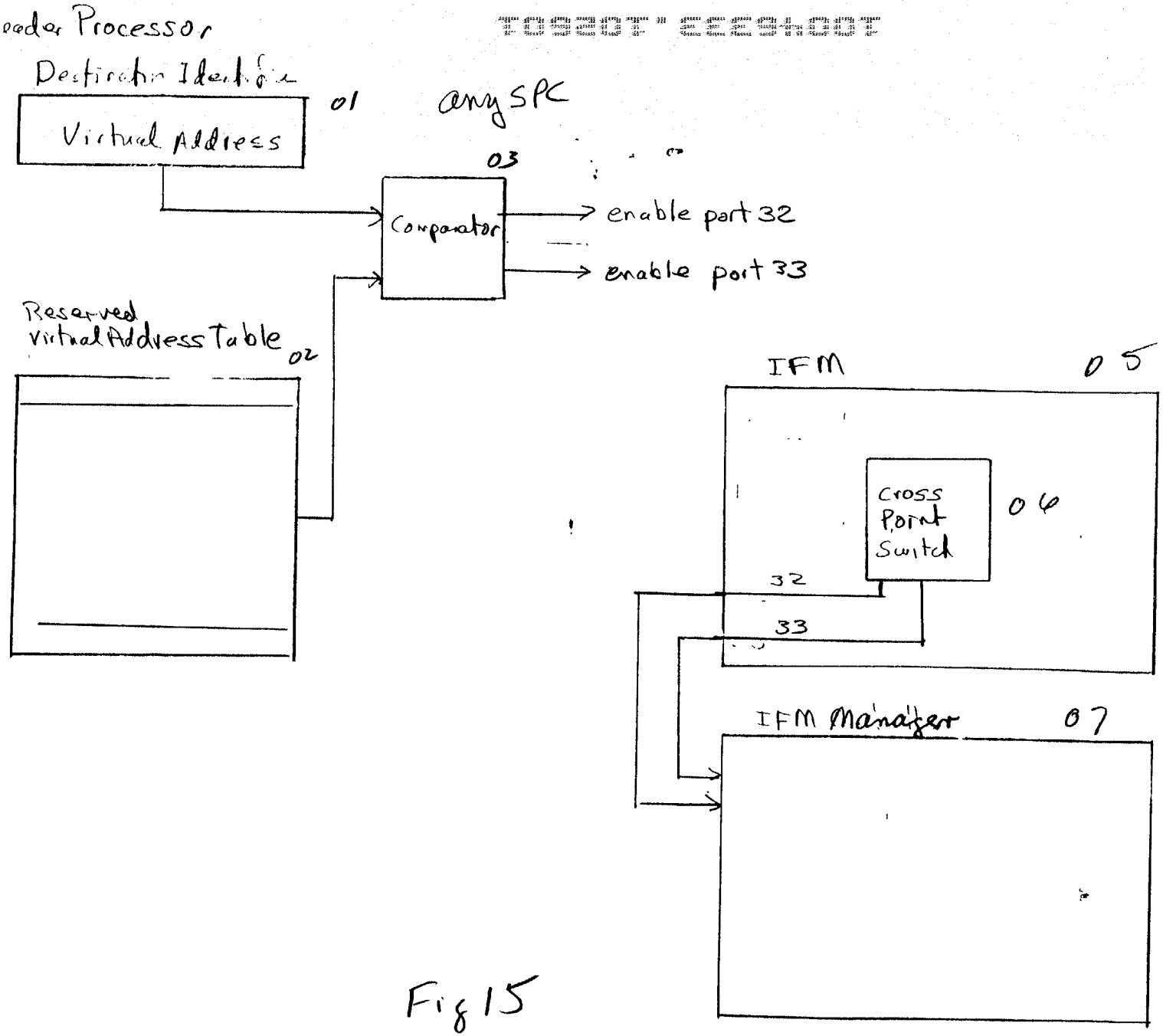
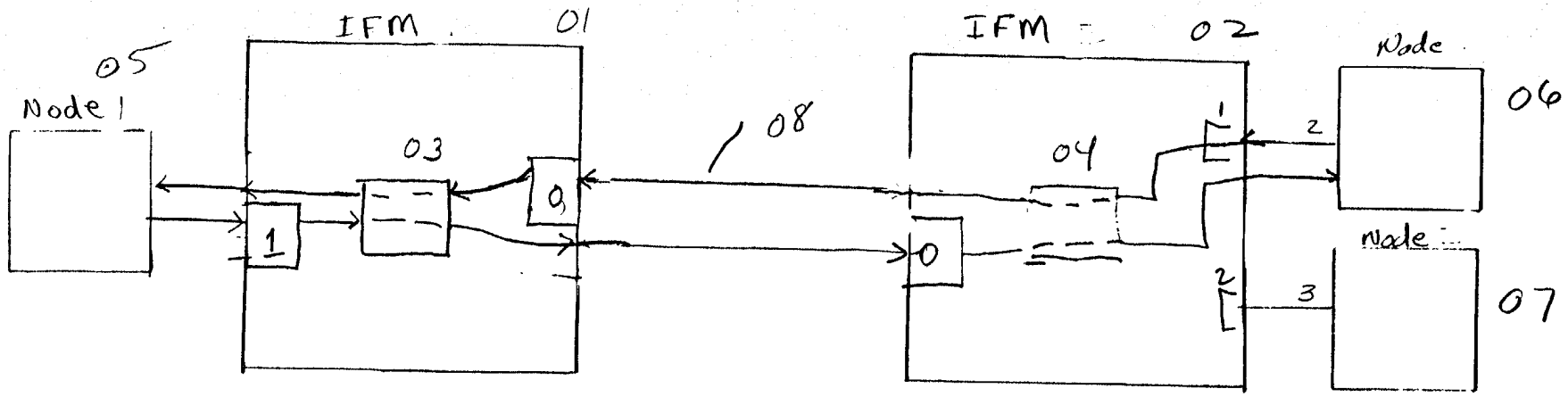

Header Processor
Destination Identifier
Virtual Address
01
any SPC
03
Comparator
enable port 32
enable port 33
Reserved Virtual Address Table
02
IFM
05
Cross Point Switch
06
32
33
IFM Manager
07

Fig 15

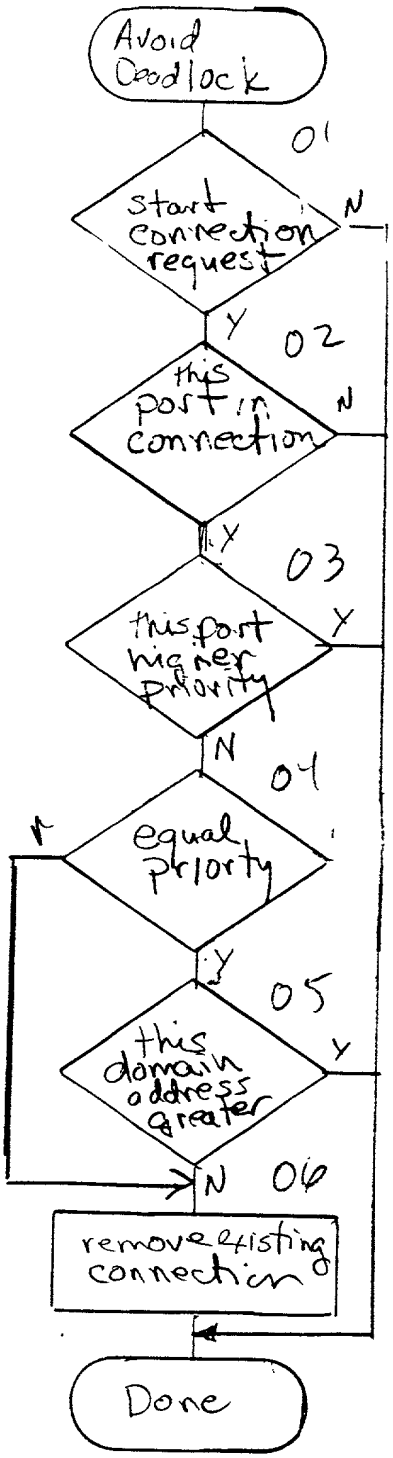


Deadlock

Time	Node 1605	IFM 1601	Node 1606	IFM 1602
0	Send start connect 1		Send start connect	
1		Connect 1 ↔ 0		Connect 2 ↔ 0
2		Forward start connect		Forward start connect
3		Can't forward start connect Node 1		Can't forward start connect

10

Fig 16



When end-to-end not established

Fig 17

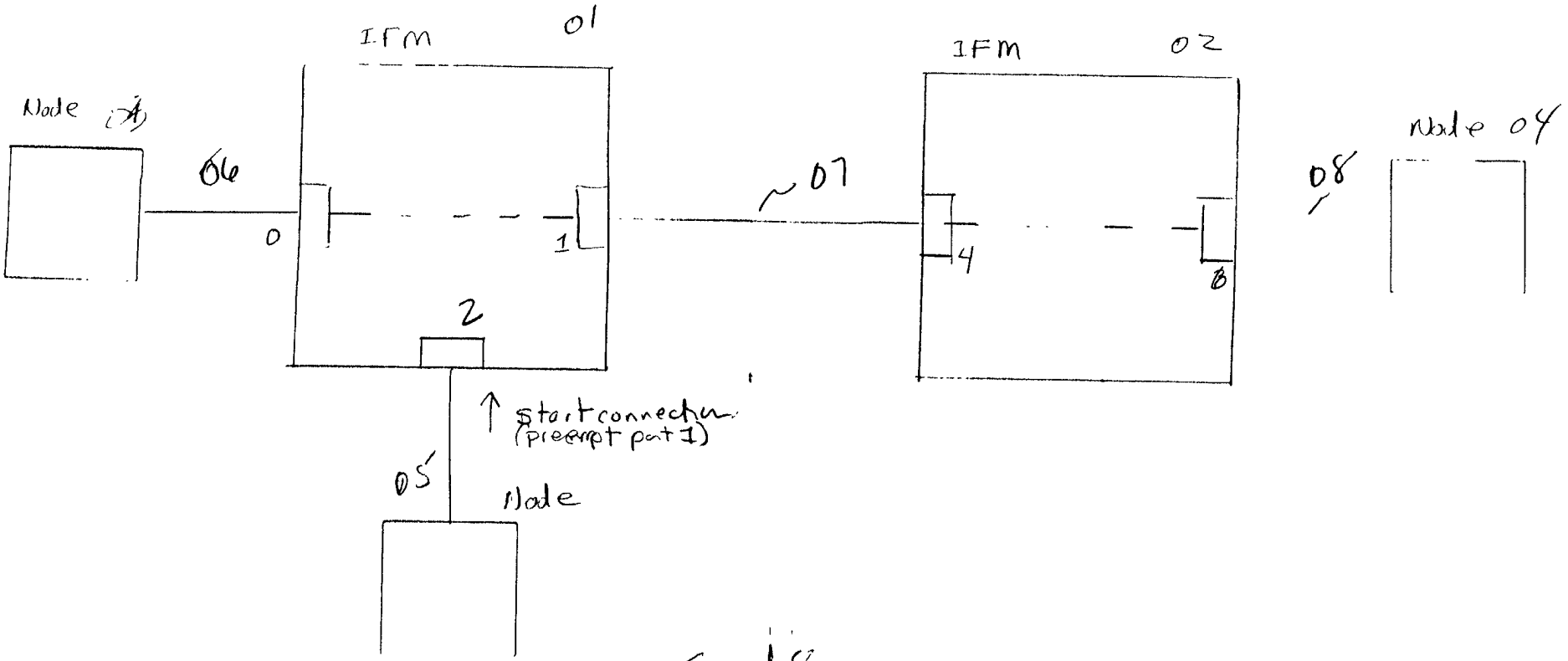

IFM
01
IFM
02
Node
06
07
08
Node 04
0
1
4
B
2
05
Node
start connection
(preempt part I)

Fig 18

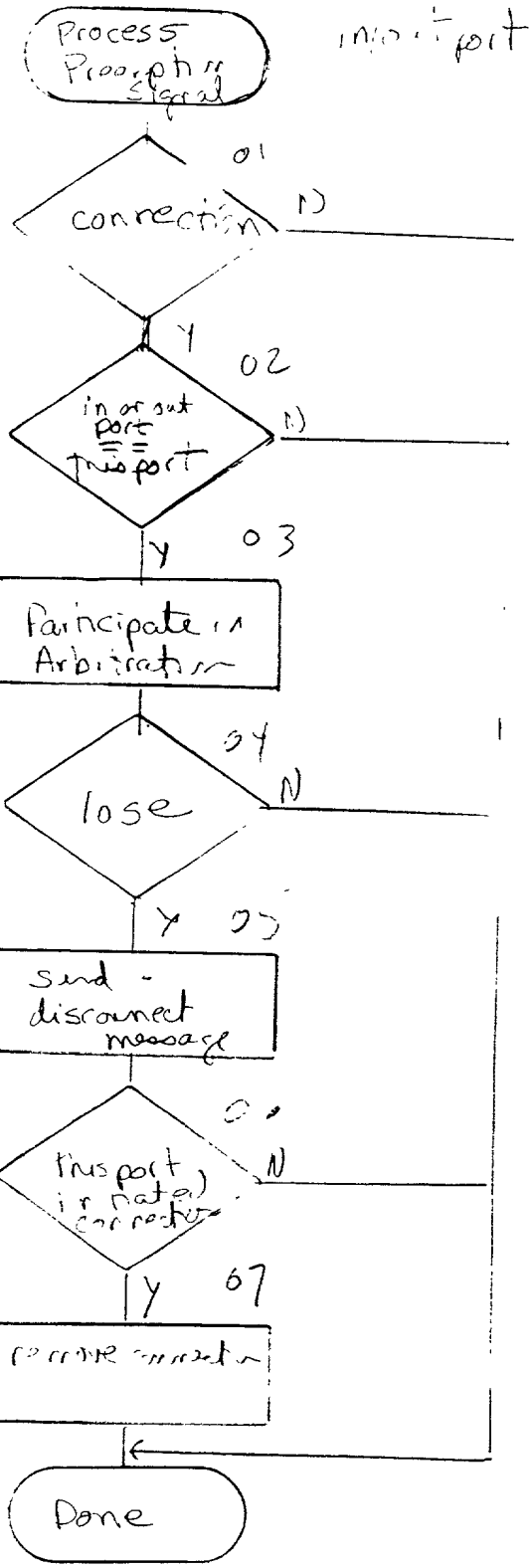

Process Preempting Signal
01
connection
N
Y
02
in or out port == this port
N
Y
03
Participate in Arbitration
04
lose
N
Y
05
send disconnect message
06
this port is not a connector
N
Y
07
remove connector
Done

Fig. 19

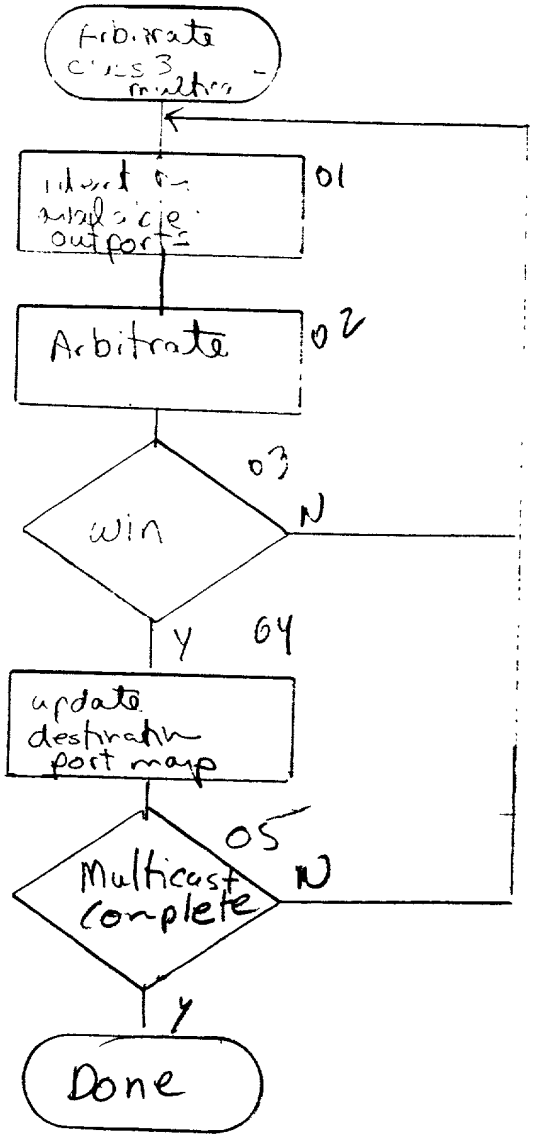

Arbitrate
01
Arbitrate
02
03
win
N
Y
04
update
destination
port map
05
Multicast
complete
N
Y
Done

Figure 20